Ohio Agricultural Experiment Station

CIRCULAR No. 97

WOOSTER, OHIO, JANUARY 30, 1910

THE WORK OF THE DEPARTMENT OF COOPERATIVE EXPERIMENTS

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INTRODUCTION*

"The experiment station is the distinguishing feature of the new agriculture. It stands for organized research in agriculture; for the concentration of the skill and energy of the entire State on the solution of the unsettled problems of the farm.

"The experiment station is created to do things which are impossible to the ordinary farmer. It is furnished with costly equipment and conducted by men trained in the methods of scientific research, who are made free from other cares in order that they may devote their undivided energies to helping the farmer.

"But while there are some things which can only be done by the aid of such an equipment as that of the experiment station, there are other things which the station can never do, and the farmer who profits most by the work of the experiment station is he who is himself an experimenter.

"It is the province of the experiment station to discover and formulate general principles. The application of these principles must be made by the farmer himself. Even were there an experiment station in every county, there would still be hundreds of farms within each county on which some of the conditions would vary from those of the station, and while no farmer should attempt to duplicate the elaborate work of the experiment station, neither can any farmer afford to blindly accept the conclusions reached at the experiment station without subjecting some of them to the test of further investigation on his own farm.

"Were there no other reason for this than the benumbing effect upon the intellect produced by the unthinking acceptance of the dicta of others, as evidenced by the unnumbered centuries during which the sickle remained unchangingly a chief implement of husbandry, this unchangeableness symbolizing a similar monotony in

* By Director C. E. Thorne, Circular 96, Ohio Experiment Station.

the farmers' intellectual processes, that alone would be abundantly sufficient. The farmer of today must learn to think or he is lost, and nothing is more conducive to exact thinking than scientific experiment.

"The experiment station should carry its work far enough to demonstrate clearly the lines which practical application must follow, but after it has reached its uttermost limit there will still be much for the farmer to do."

ORGANIZATION

In order to help the farmers of Ohio derive a greater benefit from the work of the experiment stations and other similar institutions, there was organized at the Ohio Experiment Station in 1904 a Department of Cooperative Experiments, the immediate purpose of which was to assist in the making of experiments on the farms throughout the State, as suggested above.

In the earlier years, partly because of limited funds, the work of the Department was confined quite largely to field experiment work, in which small plots of one-eightieth acre or less were used, and for which arrangements were made almost entirely by correspondence. Thus was continued, with but slight change, the experiment work of the Agricultural Students' Union,* which, by special arrangement with the Union, was taken up by the Experiment Station upon the organization of the Department. At the present time the Department's functions have come to include, in addition to a modified form of this experiment work, fair exhibits and farm management investigations. In the following pages will be outlined the work as it is proposed to conduct it in 1910, providing the necessary funds are appropriated by the legislature at its present session.

FIELD EXPERIMENT WORK

In the field experiment work of the Department great care is taken to see that the experiments are so outlined that they will fit into regular farm work. It is of course recognized that no experiment worthy of serious consideration can be made which will not require some extra work and attention. But on the other hand, one who is familiar with farm conditions and experiment work as well, can usually plan an experiment which will be fairly easy of execution and yet quite valuable to the farmer, even though it may not be of special value as a scientific investigation. The assistants in charge of the field work of the Cooperative Department have all had experience as farmers. In planning cooperative experiments they always aim to make primary the immediate interests of the cooperator and his neighbors.

* See Bulletin 88 and Circular 47, Ohio Experiment Station.

It is deemed that the adaptability of a given method or variety of a crop to a section is finally determined by its adoption or nonadoption by the farmers of that section after they have had the opportunity to study it in a field experiment on their own farms under their own control. No set of figures from experiments conducted elsewhere is nearly so convincing to most farmers as a local field trial of this kind. It is in the province of the scientific departments of the Experiment Station to conduct scientific field experiments on land which it either owns or controls and to report the results of the same to the world. But the province of the Cooperative Department, so far as field experiments are concerned, is largely to assist the farmers to make experiments themselves on their own farms. The Department helps them by outlining plans and furnishing part or all of the material for the experiment, but the execution of the work is entirely in their own hands. The experiments used in this work may for convenience be classified as follows: small plot, large plot, observation and quantitative. With these experiments may also be classified the multiplying work.

Large and small plot experiments. The large and small plot experiments are, as the names indicate, simply those in which the plots used are either large or small. In either case the size of the plots vary. The smallest plots are probably those used in the potato variety test, in connection with which enough seed of each variety is supplied to plant two rows, each two rods long. In the large plot tests the plots vary in size from one-tenth to one or more acres. The size of the large plots in all cases is determined by the conditions under which the test is to be made. It is the aim, for instance, to make each plot one or more drill or planter rows clear across the field; or, to make the entire test utilize a given area which is specially suited by location or otherwise to the purpose. In most cases material will not be supplied for a large plot test unless a representative of the Department has first visited the site of the proposed work and arranged with the manager regarding all the details.

The observation test. The observation test is one regarding which the report to the Experiment Station is based upon the judgment of the cooperator, no exact figures as to weight of produce being required. Quite a large percent of the cooperative field tests come in this class. It is specially adapted, for instance, to trying out a number of varieties of wheat or oats that have never been grown in a given section. By watching closely the habit of growth of a number of different varieties of these crops for a few seasons, even on small plots, a close observer can easily pick out the poorer ones for the existing conditions, and can then limit further

and more careful experiments to the better ones. The plots of the observation tests are not always small. In connection with the pasture work, for instance, they are frequently an acre or more in size. This depends partly on the nature of the test and partly on the conditions under which it may be made.

The quantitative test. The quantitative tests are those regarding which the cooperator is asked to determine, in pounds or some other appropriate standard of measure, the exact quantity of crop produced on each plot. They are of course the hardest of all for a farmer to make, yet one of the most popular of the Department's tests is that with the potato varieties, which has small plots so arranged that the results are of much scientific value. A modified form of the observation and quantitative tests is that in which one or more small areas of each of the large observation plots are harvested separately and exact weights of produce on same determined to serve as a check on the judgment of the eye in making the observation report.

Multiplying work. After having determined by field experiments that a certain crop or variety of crop is suited to their soil and conditions, most farmers will wish to establish that crop on their farms. In case it is a cereal crop they can do this by purchasing seed from a grower of it with whom the Experiment Station will try to put them in touch. The name and address of the individual or firm from which the Station procured the seed which it uses in cooperative work is always given on the shipping order, a copy of which is always sent to the experimenter with his material.

In case the crop is produced by the Station itself, it will undertake to help cooperators establish the same on their farms, by supplying them without expense with a small amount of the seed, with the understanding that they will take all reasonable care to keep the seed as pure as it was supplied to them, and will sell the produce of it, as soon as their own wants have been supplied, at reasonable prices, to their neighbors or to others who may be referred to them. The Experiment Station itself will sell no seed, but if farmers wish to procure seed in larger quantities than the Station can supply in this multiplying work, they can in many cases secure it from persons to whom seed has been supplied for multiplying purposes in former years.

The work as conducted in 1909, for which the Station supplied part or all of the material, and which will doubtless be continued without material change in 1910, includes the following lines:

LINES OF FIELD EXPERIMENT WORK

Kind of Work	Small Plot	Large Plot	Obser-vation	Quanti-tative	Multi-plying
Corn	S	L	O	Q	M
Wheat	S	L	O	Q	M
Oats	S	L	O	Q	M
Soybeans	S	...	O	Q	M
Potatoes	S	...	...	Q	...
Fertilizers	S	L	O	Q	...
Lime	S	L	O	Q	...
Alfalfa	S	L	O	Q	...
Grasses	S	L	O	...	...
Formalin for oat smut	...	L	O	...	...
Tanglefoot for canker worm	S	...	O	...	...
Strawberry	S	...	O	...	...
Plant Breeding	S	L	...	Q	...
Forestry	...	...	...	...	...
Miscellaneous	...	...	...	...	...

The work in connection with each of the items listed usually includes several different features. For instance, with corn there are grain and silage variety tests, tests of thickness of planting and date of planting, breeding work, etc. Persons interested in any of the crops or work named, and wishing to take up work along any line regarding them, should write to the Station for details for which there is not space in this circular. As indicated by the term "Miscellaneous," the work is not necessarily limited to the above named features. It is the Experiment Station's desire to help farmers, so far as possible, along all lines in which they are interested. All are therefore invited to communicate their desires to the Station, even though not referred to in this list, and if possible special tests will be planned for them. If it should not be possible to grant the request no harm will be done. The forest-tree planting work, which for a number of years was conducted through the Cooperative Department, has now grown to such proportions that in 1909 the Department's only connection with it was that in regard to shipping, and even this will probably not be necessary in 1910. The alfalfa and grass work has been and probably will continue in cooperation with the Office of Seed Distribution of the Bureau of Plant Industry, United States Department of Agriculture.

County tests. A very interesting phase of the corn work in 1909 was the large plot variety tests, which were conducted in cooperation with a number of the county corn improvement associations. In these tests each grower of good corn in a given section was invited by the Association in that section to supply a sample of his corn to be tested for yield in a field plot test, side by side, with that

supplied by the other growers of his section and with varieties from a distance which were supplied upon request by the Experiment Station. Strange as it may seem, the different varieties that are in use in the same neighborhood will vary in yield from each other from 15 to 35 bushels of grain per acre, when planted side by side in a field test in this way. This work includes silage as well as grain production. In all, fourteen counties took up the work in 1909——Butler, Warren, Mercer, Logan, Putnam, Van Wert, Huron, Lake, Columbiana, Franklin, Hardin, Fairfield, Belmont and Meigs. A number of these counties had duplicate tests, one having the work duplicated on fourteen different farms.

County field meetings. A valuable feature in connection with these tests is the small field meetings at which all persons interested in the test, together with a representative from the Station, gather several times within the crop season to examine and make record of the condition of the various plots. It is probable that the greatest value of a corn show is to get farmers together to talk corn, also that after the first few shows in a neighborhood the actual judging of the corn and the awarding of prizes is more or less of an injury because of the inability of the judge, after the farmers have improved their corn to a certain point, to determine which is really best. In these county field tests the judging is done by the soil, thus robbing the meeting of the injury above mentioned. On the other hand, there is a better opportunity to talk corn with the growing plants before them than there is at a corn show. This work should be considered carefully by every association in the State before determining upon plans for 1910. It need not be confined to corn alone. Tests with potatoes were also taken up in a similar manner in 1909. It may be well to include fertilizers, alfalfa, grasses, soybeans or any other suitable crop.

FAIR EXHIBITS

For a number of years the Experiment Station has been making exhibits at county fairs. These exhibits are not of the kind made by individuals. They do not enter into competition for prizes, but are to illustrate in a concrete manner the improved methods that have been developed by the Station for increasing the net value of crop and animal production. So far as possible, the actual material regarding which the information is to be given is used in making up the exhibit.

For this exhibit there is needed a well-lighted building or tent not less than 40x60 feet in size. A representative of the Station is always on hand the Monday morning preceding the fair to install

the exhibit, and throughout the busy days of the fair the Station provides three or four men to explain the exhibit to those interested. All this is without expense to the county agricultural society other than that connected with supplying the building or tent, drayage to and from the railway, lumber for shelving, carpenters, etc.

In 1909 two exhibits were maintained in the field throughout the fair season—twenty fairs being reached. In the estimate which has been presented to the legislature for the work of the Cooperative Department in 1910, provision has been made for a third exhibit. Further information regarding the fair exhibit work will be given in a circular which is now being prepared and which will be supplied upon request as soon as issued.

FARM MANAGEMENT INVESTIGATIONS*

The Cooperative Department is also making a study of the rotations, cropping, feeding and business methods that are in use upon the farms throughout the State. If the farmers of Ohio are to keep pace with the advancing prices of land and labor they must not only have the best crops and livestock for their conditions, but they must also use the best methods in handling them. It is probable that all these are being used, in piece-meal at least, somewhere within the state. To find these practical illustrations of advancement and introduce them to all is what the Department is undertaking to do.

Cost of production. In order to determine the cost of production of crops and livestock, a number of farmers are reporting to the Station in detail regarding each half-hour of time and each cent of money expended on their farms and all income therefrom. Cooperators in this work are supplied with suitable blanks and receive monthly statements for their farms showing the distribution of labor by field, by operation and by crop or enterprise, and, later in the season, a summary for the important crops.

Enterprise work. A number of other farmers are reporting this information regarding a single enterprise on their farms, such as the dairy, the poultry or a single crop. In the *dairy* work each cooperator is supplied with a Babcock milk tester, scales, sampler, blanks, etc., and reports each month the produce of and the feed consumed by each cow in his herd. On the basis of these reports the Department prepares and supplies to the cooperator each month a statement showing the total pounds and value of milk and butterfat produced and of feed consumed by each cow.

* A part of this work is in cooperation with the Office of Farm Management of the U. S. D. A. Bureau of Plant Industry.

Circulars are now being prepared regarding the dairy work up to the present time, the varieties of corn now being grown in the state, the cropping and business methods used in growing orchard grass, and regarding minor farm equipment. As soon as issued these will be mailed upon request.

Farm examinations. Hereafter upon request the Station will undertake to have a representative visit farms throughout the State, to make a study of them and outline cooperative experiments which will enable the farm manager to determine for himself with accuracy whether or not changes in his plans or methods are advisable. Applicants for these examinations must not expect to receive off-hand advice. Counsel not based on complete and accurate information such as these experiments, considered in connection with experiments made elsewhere, will afford, usually would be of little value. Applications should be made as far in advance as possible, so that visits may be made in circuits to save time and expense.

Agricultural survey. All the information that may be gathered by any phase of the Department's work will be assembled from time to time to contribute to an agricultural survey of the State, which is now being conducted by the Experiment Station. For some time, in furtherance of this end, and because of the diversified conditions existing in many of the counties, all reports to the Department have been recorded by township instead of by county. In this connection may be mentioned a circular, now being prepared, which will show graphically, by township, the statistics of farm products for the whole state, and which is based upon the statistical reports made to the State Board of Agriculture by the township assessors.

Messrs. M. O. Bugby, Gail T. Abbott, W. A. Lloyd and W. M. Cook have charge of the cooperative field work in separate districts of the State, and also of certain phases of the farm management investigations that have been assigned to them for study and report. Mr. W. L. Elser has charge of office record and statistical work.

The preceding statement of the work of the Department of Cooperative Experiments has necessarily been made brief. It is hoped, however, that all persons interested will be so kind as to give the Station an opportunity to explain further regarding any phase of it.